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SHORTAGE OF CRITICAL SKILLS

by

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SHORTAGE OF CRITICAL SKILLS

A SEVERE SHORTAGE of skilled craftsmen and technicians is plaguing industry, research laboratories, and the armed services—even the ordinary citizen who needs a competent repair job on his automobile or TV set. The extreme complexity of many devices now used in the factory, in the home, and at bases where men are trained for modern warfare has generated a constantly rising demand for skilled workers. The fact that this demand is not being met from accustomed sources has been called "a number one national problem" by Secretary of Labor James P. Mitchell. And he predicts that "as technology advances, this problem will grow worse." [1]

The wide publicity given to the country's need for more engineers, physicists, and other scientists has tended to obscure the no less pressing need for greater numbers of highly trained workmen. Present-day technology requires the combined efforts of teams of professional and sub-professional specialists, and the skilled workers is—in Mitchell's phrase—"the anchor man on the team."

The contributions of scientists and engineers to industrial progress, modern living, and national security depend in large measure upon the supporting efforts of a middle group which has been described as standing between "the thinker at the top and the manual worker at the bottom." This in-between body of trained men and women, if large enough, could greatly ease the scientist-engineer shortage by taking over routine tasks on which the professionals now must spend much of their time.

Makeup of Nation's Skilled Working Force

While there is no standard definition of the term "skilled worker," most experts agree that the bulk of the skilled work force falls into one or the other of two Census Bureau classifications. The classifications are (1) "craftsmen, fore-

[1] Address before Town Hall, Los Angeles, Sept. 6, 1956.

men, and kindred workers"; (2) "professional, technical, and kindred workers." In the first category, the Census Bureau lists 59 occupations, ranging from boilermaker, through electrician, machinist, and mechanic, to toolmaker; in the second are about a dozen sub-professional occupations, including dietitian, draftsman, radio operator, therapist, and dental, medical, testing, and other technicians.

Exact figures on the present size of the skilled work force are lacking, but it is estimated that there are about nine million craftsmen-foremen and about half a million technicians. Altogether, skilled workers comprise between 10 and 15 per cent of the total civilian labor force.

Some of the persons included in the two Census Bureau classifications may not be skilled workers, and some not included may be men and women with critical skills. Such classifications are admittedly somewhat arbitrary and subject to varying interpretations, but there is fairly general agreement that the criteria for determining who is a skilled worker include distinctive ability, specified level of competence, and special training.

Sometimes certain distinctions are drawn between craftsmen and technicians: The craftsman is apt to have acquired his knowledge through practical experience in the shop; the technician, through one to three years of formal training after high school. The craftsman is likely to be engaged in production or maintenance work; the technician, in design or development activities. The hallmark of the technician is his "unique blend of some professional knowledge and manual . . . skill." He stands "between the . . . craftsman and the professional . . . in the developmental structure of American jobs, in his work performance, and in educational attainment." [2]

One expert has described the characteristics that craftsmen and technicians have in common in the following terms:

> In industry, skilled and technical workers are distinguishable from other factory and clerical workers by the intensiveness and extensiveness of their knowledge and skills, and by the degree to which they must use initiative, resourcefulness, and other predominantly mental processes in their work . . . [They] must do more than assemble, disassemble, operate devices, and follow plans. They are often required to initiate plans, diagnose . . . conditions, . . .

[2] Seymour L. Wolfbein (of Bureau of Labor Statistics), in National Manpower Council, *The Utilization of Scientific and Professional Manpower* (1954), p. 50.

> effect repairs, localize . . . problems, and determine solutions. . . . They must go beyond the sheer mechanical performance of a job. . . .
>
> Skilled workers are distinguishable from . . . professional people in that they usually receive instructions from these latter groups. The former are required to adjust, calibrate, repair; engineers must invent, . . . alter, . . . refine. The skilled man leans heavily on practical experience while the engineer depends on theoretical knowledge gained through long years of formal schooling.[3]

The skilled worker is said to bridge the gap between the machine operator and the engineer, so that an unbroken chain of skill extends from the parts handler to the top engineer or scientist.

Extent of Shortage of Craftsmen and Technicians

Just as there are no precise statistics on the total number, so there are no exact figures on the overall shortage of skilled workers. Figures are available, however, on the shortage of skilled manpower in the armed services. And it is known that at least 250,000 skilled workers are needed each year to replace those who die, retire, or go to work in other fields.

Secretary of Labor Mitchell said in Los Angeles, Sept. 6, that the military services, "with a strength of only three million men, are roughly 30 per cent short on fully qualified skilled personnel needed to fill many thousands of critical military jobs." He cited, as examples, the need for 35,000 aircraft mechanics and electronics technicians, 25,000 electronic equipment operators, and 18,000 communications equipment mechanics.

The Automobile Manufacturers Association stated late last year that 40,000-45,000 new mechanics were needed annually but only some 10,000 with adequate training were added to the labor force each year. Estimates of the requirements for technicians have ranged from 12,000 to 22,000 a year. A Bureau of Labor Statistics study of molders and coremakers indicated that 18,000 would die or retire between 1952 and 1962 and only 14,000 were expected to enter that field of employment during the decade.[4]

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[3] Karl R. Kunze (manager, training department, California division, Lockheed Aircraft Corporation), in National Manpower Council, *Improving the Work Skills of the Nation* (1955), pp. 100-101.

[4] Bureau of Labor Statistics, *Mobility of Molders and Coremakers, 1940-1952* (Bulletin No. 1162, 1954), pp. 14, 15.

Other types of skilled workers known to be in short supply include airplane mechanics, die makers, electricians, instrument repairmen, machinists, pattern makers, and toolmakers. A rough indication of the trend of the skilled-worker shortage may be obtained from the number of job openings listed by state employment agencies. From 1950 through 1953, openings in the skilled-occupations category outnumbered those in any other. The openings declined in 1954, rose in 1955, and have climbed higher this year.

Even more serious than the insufficiency of numbers is the inadequacy of skill possessed by thousands of the craftsmen now employed. Recent surveys of a number of industrial firms showed that many of their workers did not have the basic education and training necessary to keep up with major technological developments. And many a householder can testify to the poor quality of repairs made to his home appliances by supposedly skilled workmen. "The work gets done—but what about the workmanship? . . . There is more than a little justification for the complaints we hear concerning . . . slipshod work." [5]

E. R. Chappell, in charge of a Labor Department program to raise the skill level of the nation's work force, has said the situation could be "improved considerably if . . . opportunities [were provided] for a large proportion of those presently in skilled occupations to bring up the quality of their skills and technical knowledge." [6]

Importance of Artisans to Industry and Defense

The shortage of skills is of particular concern to the government and industry because trained craftsmen and technicians play a crucial role in raising the productiveness of the economy and in maintaining the nation's defenses.

As Secretary Mitchell observed before a conference on skilled labor called by the National Manpower Council at Harriman, N. Y., in the spring of 1955: "It's all well and good to have men who can invent a new weapon, or a new way of making something, but the blueprint is virtually useless unless you have a skilled work force of great diversity and flexibility to lay out the plan, design . . . [and] make the machines, and keep them running." And it follows

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[5] Remarks of W. F. Patterson, director, Bureau of Apprenticeship, U.S. Labor Department, at First National Skilled Manpower Training Conference, sponsored by Virginia Apprenticeship Council, Old Point Comfort, Va., July 6, 1955.

[6] Copyrighted interview in *Nation's Business*, June 1956, p. 91.

that the unskilled, by themselves, can make little contribution to the country's industrial progress.

At the same conference Dean Courtney C. Brown of the Columbia Business School explained the importance of the technical skills of American workers in these terms:

> The United States today produces approximately 50 per cent of the total world's production. . . . That 50 per cent is produced by a labor force . . . [of only] eight or nine million skilled workers, and perhaps half a million technicians, working under some five million professional and scientific individuals. In other words, half of the world's production rests upon the shoulders of only about 14 million highly trained people.

Except in times of national emergency, most Americans overlook their dependence on the comparatively small number of craftsmen and technicians who build, install, control, and maintain the machines in factory and office and produce, service, and repair equipment in the home. They are apt to forget, moreover, that the armed forces today need men who can do much more than drill and fire a rifle.

The Army, Navy and Air Force now require technical personnel with higher degrees of skill than ever before. The anti-aircraft guns of 1941 could be handled and maintained by small crews of relatively unskilled GIs, but the Nike battery of today must be manned by about 100 highly skilled men. The military's problem is complicated by the fact that many of the specialists trained in the services do not re-enlist but leave to take better-paying jobs in industry. The shortage of electronic technicians and aircraft mechanics reportedly has kept some Strategic Air Command planes on the ground.

The seriousness of the skilled-worker shortage is heightened by the fact that the Soviet Union is fast increasing both the quantity and quality of its craftsmen. A report made late last year by a subcommittee of the congressional Joint Economic Committee spoke of the "generally accepted evidence . . . that technicians are . . . being turned out [in the U.S.S.R.] at 30 or 40 times our rate." Officials have warned that the American advantage of superior quality also is being cut down. Lt. Gen. C. S. Irvine, Air Force Deputy Chief of Staff for Materiel, stated during a broadcast on Oct. 15: "If we are going to stay ahead [of the Russians], we must train more technical people and be willing to pay the cost of more effort in research and development."

Reasons for Shortage of Skilled Workers

THE NEED for skilled workers is determined mainly by the weight of demand for goods and services and by the nature of the technology by which they are produced. The simple fact is that the increase in numbers of craftsmen and technicians has lagged far behind the phenomenal rise in national output. While the gross national product has roughly quadrupled in the past quarter-century, the skilled labor force has increased by only about one-third.

The growth of population, national income, and industrial production all have contributed to the increased requirements for technical skills. As society has become more complex, and the wants of the populace more varied, service industries have expanded tremendously. That expansion has added to the demand for technicians and craftsmen because as a rule service personnel must possess skills well above those of production workers. In many cases, as a result of mass output techniques, more skill is now required to repair a mechanism than to make it in the first place.

Expansion has been most striking in such industries as aircraft manufacture and air transport, communications and electronics, chemicals and plastics, air conditioning and processed foods. Their growth in turn has multiplied the need for skilled manpower.

Even in industries enjoying less spectacular growth, advances in technology have necessitated the employment of ever-larger numbers of trained workers. Mass production, while eliminating the need for certain skills, has created demands for new ones. Increased mechanization has reduced the degree of skill required on the assembly line but raised the skill requirements in other phases of the industrial process. Craftsmen and technicians are needed to help set up industrial operations. They are used, more and more, to install and maintain new equipment. They are employed in increasing numbers to serve as inspectors, troubleshooters, and utility men.

Automation will bring a "continuation of the trend toward employing a higher proportion of workers in maintenance

and service activities and smaller percentages in direct production functions." [7] Additional numbers of technicians will be required to help design, install, adjust, and maintain the complex new automatic machinery. Although automation will diminish the need for semi-skilled workers, it will increase the need for highly skilled craftsmen. It has been estimated that by 1975 the country will be getting along with 25 per cent fewer laborers, but will need 75 per cent more professionals and technicians.

The growing complexity of the economy, in short, has caused a mounting demand for skilled workers in almost every field. Labor Secretary Mitchell has commented that nowadays "Almost every job requires a special skill." The workman who once measured with calipers now uses micrometers and may soon be measuring with light waves. "Today craftsmen need not only greater but more well-rounded skills . . . because everything we build and use is more complicated." [8]

Reduced Flow of Skilled Workers from Abroad

Up to World War I much of America's skilled labor was provided by immigration. But since the 1920s, when severe limitations on the number of new entrants were first imposed, comparatively small numbers of skilled workers have come from abroad. According to Immigration and Naturalization Service figures, in the first decade of this century more than 1,163,000 "craftsmen, operatives, and kindred workers" were admitted to the United States. In the decade of the 1920s that figure dropped to about 592,000, and in the 1930s to fewer than 43,000.

Since World War II, immigration has furnished as few as 4,157 "craftsmen, foremen, and kindred workers a year" (in 1946) and as many as 21,832 (in 1950). In the year ended June 30, 1955, latest for which such statistics are available, 18,867 persons in the skilled categories entered the country. Because the Immigration and Naturalization Service used different systems of classification at different times, the above figures are not strictly comparable, but they do indicate the sharp decline in immigration as a source of skilled workers.

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[7] Richard H. Lewis (of Bureau of Labor Statistics), address before American Statistical Association, New York, Dec. 29, 1955.

[8] James P. Mitchell, "Shortage of Skilled Labor," *Harvard Business Review*, September-October 1955, p. 24.

The present immigration law, the McCarran-Walter Act of 1952, like the law it replaced, limits immigration by a system of national quotas, but gives preference to individuals with special skills. The act specifies that the first 50 per cent of each nation's quota shall be assigned to persons whose "high education, technical training, specialized experience, or exceptional ability" would be of substantial benefit to the United States. According to a National Manpower Council study, "This preference provision . . . has made little practical difference because nine out of ten quota immigrants have been coming from countries in Western Europe that have been using up only a part of their quotas." [9]

Not only are fewer skilled workers entering the U.S. labor force through immigration than in earlier years, but a substantial number of those who do come from abroad may not be able to fill jobs that call for high technical skills. Some of the occupations classified as skilled in foreign countries are not considered skilled in this country and numerous immigrants classed as "skilled workers" have not had adequate training. "It seems safe to estimate the annual addition to the skilled . . . [work force] through immigration now and in the near future at about 10,000." [10]

Ways To Enlarge Reservoir of Skills

SKILLED WORKERS acquire their skills in many different ways. Some learn by becoming apprentices or participating in specialized training programs in industrial plants; others, by attending vocational schools, technical institutes, or two-year colleges. Thousands of young men get technical training while serving in the armed forces. Other thousands pick up their special knowledge through random experience. All get their start toward becoming skilled workers in elementary or secondary schools. Any effort to

[9] National Manpower Council, *A Policy for Skilled Manpower* (1954), p. 285.

[10] *Ibid.*, p. 213. In one critically important field, a Labor Department study has concluded, "Foreign-born and trained tool and die makers are a diminishing source of new workers . . . , and the prospective flow of immigrants under present conditions indicates that there can be no dependence on this source in the future."—Bureau of Labor Statistics, *Mobility of Tool and Die Makers, 1940-1952* (Bulletin No. 1120, 1952), p. 13.

enlarge the national reservoir of skills must take into consideration all the ways in which skills are acquired.

The National Manpower Council[11] has listed five major lines of action to be pursued in endeavors to strengthen the country's resources of skilled manpower:

1. The contributions of secondary education to the acquisition of skill must be enhanced.
2. More effective vocational guidance programs must be developed.
3. More equal opportunities for all individuals to acquire skill must be provided.
4. Facilities and methods used to train skilled workers must be improved.
5. Knowledge about manpower resources must be increased.

To help in expanding the supply of skilled workers the Department of Labor last year set up a "skills of the work force program," headed by E. R. Chappell, an assistant to Secretary Mitchell.[12] Principal objectives of the program are to improve techniques for measuring future manpower requirements; promote wider use of guidance services; supply more occupational outlook information to schools, industries, and trade unions; encourage communities and industries to survey their own future labor needs; promote research on training practices; and stimulate national, state, and local organizations to support effective training programs.

Better Inventories of Need and Available Supply

Discussing the program before a House Appropriations subcommittee last January, Secretary Mitchell said: "With the development of improved technological methods . . . we believe there is going to be a decided change . . . in the skill requirements of jobs in a particular industry. . . . It is our feeling that the government needs to take the leadership in developing inventories of the kinds that are going to be required five . . . [or] ten years from now and to promote within industry . . . , unions . . . , [and] schools the . . . [realization that it is necessary to train] people . . . for these new skilled jobs."

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[11] The National Manpower Council was established at Columbia University in 1951, when Dwight D. Eisenhower was its president, under a grant from the Ford Foundation.

[12] Chappell heads a small staff that develops and coordinates the program's various projects; the actual work is performed by the divisions of the Labor Department.

If government and industry are to plan programs to assure an adequate supply of technical skills, they must know how many skilled workers are now available and how many will be needed in the future. At present there is no adequate inventory of craftsmen and technicians and no satisfactory estimate of future requirements. Detailed census data, the main source of facts used in manpower studies, provide information only at ten-year intervals and that information needs considerable refinement before it can be used to develop precise manpower figures.

The Labor Department recently began a study designed to afford accurate estimates of future requirements for skilled workers. The study, scheduled to be completed in about a year, will identify the areas in which special efforts are needed to assure an adequate supply. The Bureau of Labor Statistics plans to issue next summer the third revision of its *Occupational Outlook Handbook* (the latest one was published in 1951), which will bring together the available data on current employment and job prospects in some 500 occupations. The Bureau of Employment Security is working on a major overhaul of the *Dictionary of Occupational Titles* in order to furnish more precise definitions of skilled jobs.

Improvement in Quality of Secondary Education

The key to broadening the base for gaining skills is improvement of the quality of education provided by the secondary schools. The basic schooling received by an individual determines whether he can go on to become a skilled worker. Unless he learns how to communicate effectively, to figure correctly, and to resolve problem situations, he will not be able to master the fundamentals of a skilled occupation.

The result of failure to acquire even the rudiments of an education can be seen in the armed services' experience with inductees. During a recent one-year period, 11 per cent of all young men summoned to duty failed to pass the armed forces qualification test; among those from the southeastern states with large Negro populations the rejection rate was almost 28 per cent. Approximately one-third of all inductees, and more than one-half of those from the Southeast, were considered unsuitable for advanced training.

Any substantial increase in the number of skilled workers, the Labor Department has stated, "will require improvements in the quality and quantity of secondary education" [13] Participants in nearly a dozen conferences sponsored by the National Manpower Council emphasized that high schools "should devote themselves to better teaching of fundamentals and to instilling attitudes of ambition, responsibility, and adaptability, rather than to specialized training for work." They agreed almost unanimously that the basic need was for better training in reading, writing, and arithmetic. Many of the participants thought also that, in view of the increasing complexity of industrial processes, secondary schools "should provide more and better training in mathematics and the sciences." [14]

Opinions of the conferees on the value of vocational education were mixed. Some opposed vocational training, others favored it, but most took no strong stand one way or the other. The majority had no objection to vocational training if it was not allowed to interfere with "other more important objectives." Of the roughly 20,000 public high schools in the United States, about 2,000 offer trade and industrial programs; around 400 of these are primarily vocational schools and 1,600 are general schools with vocational departments.

The National Manpower Council has recommended that most students be required to complete at least two years of the basic high school course before being allowed to concentrate on vocational subjects. The Council has urged that local school officials, in cooperation with industry and labor representatives, reappraise vocational training programs to make sure that they are still effective in the light of changes in technology, employment standards, and on-the-job training practices; armed services' training programs; and the growth of junior colleges and technical institutes. And it has suggested that Congress review the legislation providing federal grants to the states for vocational education[15] to determine whether that program repre-

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[13] Department of Labor, *The Skilled Work Force of the United States* (pamphlet, 1955).

[14] National Manpower Council, *A Policy for Skilled Manpower* (1954), pp. 110-111.

[15] In recent years, Congress has been appropriating between $25 million and $30 million annually for grants in four fields of study—agriculture, home economics, distributive occupations, trade and industrial programs. The states have been putting up more than $4 for each $1 of federal funds.

sents the most effective contribution the government can make to building the nation's resources of skilled manpower.

Provision of Better Vocational Guidance Services

One way to increase the nation's pool of skilled manpower would be to make certain that no person wastes his talents by choosing the wrong job. To prevent bad choices of occupations it is necessary that high school students, parents and others have access to detailed and accurate information on the nature of various lines of work, the training these lines of work require, and the opportunities they offer for employment.

The principal source of vocational guidance is the high school, but only an estimated 17 per cent of the nation's secondary schools now have guidance services. Public employment agencies, the Veterans Administration, social service and other private organizations also provide vocational guidance, but most of these agencies, like the schools with guidance services, tend to be concentrated in metropolitan areas. Consequently, most students do not receive the assistance needed to make proper decisions as to school courses and future occupations.

Employers frequently complain about the inadequacy of vocational guidance in the public schools. They maintain that many guidance counselors seem to have little reliable information on employment opportunities, even in their immediate localities. Guidance personnel themselves protest that they are forced to spend disproportionate amounts of time either counseling disturbed youths or performing routine administrative tasks.

In the view of Secretary Mitchell, "The problem of providing more adequate guidance services is primarily a state and local responsibility." [16] Champions of vocational guidance have urged that state and local governments increase the funds and personnel allocated for counseling in the schools. They have recommended also that counselors be used primarily to give vocational guidance rather than to advise in personality-adjustment cases. In particular, they have stressed the importance of having government, in-

[16] Address before National Vocational Guidance Association, Washington, Mar. 27, 1956.

dustry, labor, and civic groups all participate in providing fullest possible information on job situations.

EXPANSION OF APPRENTICESHIP PROGRAMS IN INDUSTRY

One method of increasing the number of skilled workers that has not been fully utilized is apprenticeship training. In general apprenticeship is held to be the best way of acquiring all-round skill. Graduates of good apprenticeship programs are prepared for a trade rather than for a specific job and can readily adjust to changing conditions. Workers who pick up their knowledge through informal training are less likely to have fully developed skills and consequently are handicapped in meeting new problems.

Apprenticeship involves a formal agreement requiring the employer to train the fledgling worker in his shop for a specified period; in return, the apprentice agrees to work for the employer until completion of his training. The agreement stipulates, among other things, the wages and wage increases the apprentice is to receive. Apprenticeships may last anywhere from two to eight years.

Most apprentices are participants in programs registered with the Bureau of Apprenticeship of the U.S. Department of Labor.[17] The bureau does not regulate, only promotes, the apprenticeship programs. It depends on, and encourages the formation of, joint labor-management committees that make policy, set standards, and urge employer and employee groups to set up additional training programs.

Registered programs have produced, on the average, only 30,000 to 40,000 journeymen annually in recent years. Programs that for a variety of reasons are not registered with the Bureau of Apprenticeship may have turned out as many more. Thus, it is clear that random work experience and informal training on the job are producing most of the country's craftsmen. According to E. R. Chappell, head of the Labor Department's skills-of-the-work-force program, "Only a fraction of the skilled craftsmen needed are being trained through . . . programs such as apprenticeship." And the existing apprenticeship programs, he has said, are adequate "neither in . . . numbers nor in quality." [18]

[17] To be registered with the Bureau (or one of the 27 state apprenticeship agencies that it has recognized) such programs must comply with certain recommendations of the Federal Committee on Apprenticeship, a group composed of representatives of labor, management, and the U.S. Office of Education.

[18] Copyrighted interview in *Nation's Business*, June 1956, p. 92.

The trend in number of apprentices registered has been upward in recent years, but the number who actually complete their training has been falling for five straight years.[19] A study of more than 500 former apprentices who dropped out in 1951 and 1952 disclosed that the "principal reason" was the necessity to shift to higher-paying jobs in order to meet financial obligations. "Relatively few persons dropped out because they did not like the trade or because they could not do the required work." [20]

According to some experts, the narrowing differential between pay of the skilled and the semi-skilled worker has reduced the incentive to become a skilled craftsman. In the opinion of others, however, non-economic factors may be more important. Secretary Mitchell has written that the size of the worker's pay check is not the only motivating force behind his desire to acquire a special skill. "He is also influenced by such things as prestige, working conditions, job satisfaction, the degree of independent action possible, and the pattern of supervision."

> However, [Mitchell added] money is still such a key factor in a decision to enter the skilled trades that many workers may be quite reluctant to submit themselves to a long period of training if with relatively little training they can make approximately the same amount of money as a . . . skilled worker makes.
>
> Employers might do well, therefore, to take a new look at their wage-rate differentials. Are employees given an adequate incentive to enter the skilled trades? Is there a sufficient reward for the sacrifice of time and energy that is required for workers to obtain a skill? If not, many men and women are going to bypass training programs.[21]

Union practices have been held responsible in some quarters for restricting the number of apprentices trained. It is agreed that most unions have promoted apprenticeship programs as a matter of national policy but departures in local practice have frequently been pointed out. Many unions tend to be conservative in fixing the number of apprentices to be accepted. Usually that number is deter-

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[19] The total number of registered apprentices in training rose from 131,217 at the end of 1946 to an all-time high of 230,823 at the end of 1949—principally because large numbers of veterans received government benefits while taking training. The number then declined until 1954, but last year it began to climb again and reached a total of 174,722. However, only 24,445 apprentices completed training in 1955, as compared with 38,754 in the peak year of 1951.

[20] Bureau of Apprenticeship, *Follow-Up Study of Former Apprentices* (Technical Bulletin No. T-143, December 1954), pp. v, 3.

[21] James P. Mitchell, "Shortage of Skilled Labor," *Harvard Business Review*, September-October 1955, p. 30.

mined by setting a ratio of a certain number of journeymen to each apprentice. The traditional ratio is ten journeymen to one apprentice, but the actual ratio varies greatly from trade to trade. A survey of the building trades in 52 large cities showed that in 1955 there were ratios ranging from seven journeymen per apprentice among roofers to nearly 33 journeymen per apprentice among painters, paperhangers, and glaziers.[22]

E. R. Chappell has said, "If we are to train enough craftsmen through apprenticeship, a far greater number of employers must participate and many local labor organizations must take a more active interest." [23] Some industry spokesmen have proposed that business organizations promote apprenticeship by combating the belief that white-collar jobs offer the greatest opportunities. To that end they recommend increased use of movies, plant tours, and talks before school groups on the human satisfactions and personal security, as well as money advantages, that flow from possession of special skills. Certain union officials have urged wider use of apprentice contests to point up strengths and weaknesses of different kinds of training programs and stimulate interest in apprenticeship.

Removal of Race-Sex-Age Bars to Skilled Jobs

The nation's resources of skilled manpower could be enlarged significantly if restrictions on the employment of certain racial groups, women, and older persons were dropped. Job discrimination is most widespread against Negroes, but it is experienced also by Jews, Orientals, and persons of Spanish and Indian extraction. Virtually every metropolitan area has members of minority groups who represent potential additions to the ranks of skilled workers. The extent to which such individuals are prevented from working at their highest potential levels of skill is a measure of needless loss of needed manpower.[24]

Only about four per cent of all U.S. craftsmen and foremen are Negroes, and they usually are found in skilled occupations that white workers consider undesirable because of the arduous labor involved or because of unpleasant

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[22] Bureau of Apprenticeship, *Trends in Apprenticeship* (Bulletin T-144, April 1956), pp. 6, 8-9.

[23] Copyrighted interview in *Nation's Business*, June 1956, p. 92.

[24] Educational Policies Commission, *Manpower and Education* (1956), p. 47.

working conditions.[25] Except for a small number among medical and dental technicians, there are very few Negroes in the technician occupations. In the South—but also in other areas—Negroes are sometimes barred from training, apprenticeship, or membership in local unions.

The Cleveland (Ohio) Board of Education recently required all unions and employers cooperating in Cleveland's publicly-supported apprentice-training programs to file statements that they do not discriminate against Negroes. Its action grew out of charges that a local of the International Brotherhood of Electricians excluded Negroes from union membership with the result that no Negroes were admitted to the Cleveland Trade School for training as electricians.

Women are fairly well represented among medical and dental technicians and among foremen in the garment industry, but they are conspicuously absent from most other skilled occupations. About 25 per cent of all technicians, but only around three per cent of all craftsmen and foremen, are women. Workers over 45 years of age are another group now prevented from making their full contribution of skills by rules adopted in industry as an accompaniment of old-age retirement plans.

Secretary Mitchell has pressed vigorously and repeatedly for removal of barriers to the employment of all such groups. He has told audiences time and again: "We cannot afford to waste our manpower as we are now doing. We cannot afford discrimination which wastes the skills of more than six million Negroes. . . . We cannot afford the prejudice and shortsightedness which . . . are making it increasingly hard for workers over 45 to find a job. We cannot afford not to make the most effective use of the 20 million women in our work force."[26] Such forms of discrimination, Mitchell has stated, are "equivalent to letting Babe Ruth sit on the bench because you don't like the cut of his uniform."[27]

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[25] Out of 1,800 molders and coremakers who were asked in a Bureau of Labor Statistics survey whether they would recommend their occupation to a young man, fewer than half of the white workers said they would, but 70 per cent of the Negroes and men of Mexican extraction thought their calling a good one.—Bureau of Labor Statistics, *Mobility of Molders and Coremakers, 1940-1952* (Bulletin No. 1162, 1954), p. 30.

[26] Address before Notre Dame Alumni Association, Washington, Apr. 18, 1955.

[27] Address before National Manpower Council conference on skilled manpower, Harriman, N. Y., Apr. 30, 1955.